Money Isn't All You're Saving

Improve Energy Efficiency with Duct Leakage Testing

Builder Guide

DESCRIPTION

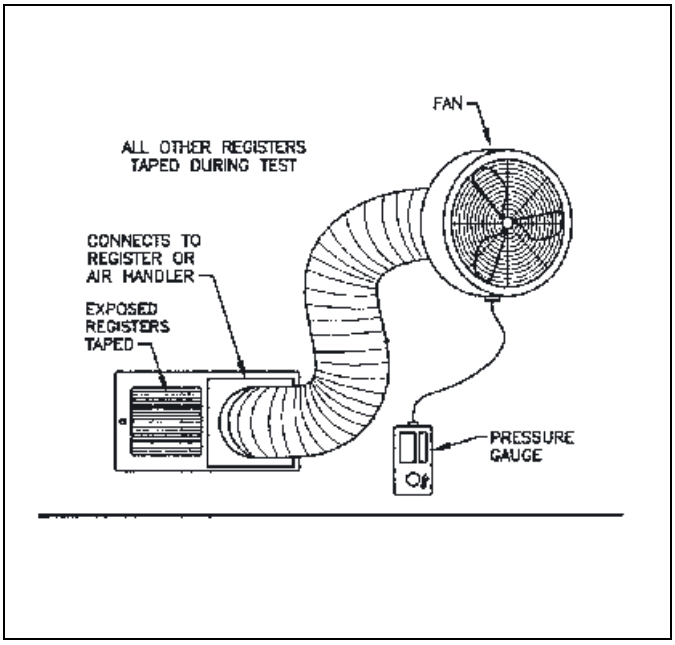
Air leaking from forced-air ductwork is not as obvious as leaking water pipes or natural gas lines. However, it can cause serious problems such as back-drafting of combustion appliances, contamination of indoor air, high energy bills and uncomfortable homes. Duct leakage must be measured to determine the impact on a particular HVAC system. If duct leakage is significant (15% or more), the ducts should be sealed to the extent possible (see the fact sheet on duct sealing), then tested again to compare performance.

Duct leakage measurement procedures have been developed and are currently being standardized by the American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE). One technique - the house-pressure test - measures indoor air pressure before and after turning on the air-handler fan. Pressure within the house should not change during the test because this fan is only supposed to recirculate indoor air. However, if supply ducts are leaking, a negative pressure will develop, and if return ducts are leaking, a positive pressure will develop. The test can also indicate if both return and supply ducts are leaking. The advantages of the house-pressure test are that it measures duct leakage under actual HVAC system operating conditions and takes only about ten minutes to perform.

Another simple test - called the "Blower Door Subtraction Method" - can easily be performed while conducting a standard blower door test. In this test, the house leakage is measured before and after the duct system registers are taped shut. The difference in house pressure under the two conditions indicates the amount of house leakage attributable to the duct system.

A third type of test - often called a "Duct Blaster" test (see diagram) - can determine the total duct leakage

Duct Testing Equipment ("Duct Blaster")



area (the sum of all leaks in the duct system.) The test is performed by sealing off all registers and measuring the air flow required to maintain a specific pressure. The advantage of this technique is that it can be performed during construction - after the HVAC system is installed but before the building is closed in.

BENEFITS

- ❑ **Duct leakage testing provides quality assurance.**

Duct testing is a quick and reliable way to determine the quality of duct system installation, and to troubleshoot potential indoor air quality problems caused by duct leakage, before they lead to customer callbacks.

❑ **Duct leakage testing can verify HVAC system performance.**

Duct leakage measurement can assure that air passing through the duct system is being delivered to the house registers. This information is needed in order to confidently right-size HVAC equipment.

❑ **Duct leakage testing can assess health and safety risks.**

The house-pressure leakage test can be easily extended to test for pressure-related safety problems (e.g. depressurization caused by exhaust-fans).

INTEGRATION

❑ **Duct leakage testing should be done by experienced professionals.**

Working on duct systems can change pressure distribution in a house. These changes can affect combustion appliance safety, indoor air quality, and occupant comfort. Duct leakage testing should only be performed by individuals who have a working knowledge of these issues and who take precautions to deal with them.

❑ **House pressure testing should be performed on ducts located in conditioned space.**

If ducts are supposed to be within conditioned space, house-pressure testing should be used to verify that they are, in fact, within the house air barrier. See factsheets *Preventing Air Leakage* and *Achieving Full Value from Subcontractors.*

RESOURCES

❑ *"Ducts Rediscovered", Home Energy* Magazine, Sep/Oct 1993. Available at 510-524-5405.

❑ *"Getting Your Ducts in a Row", Good Cents Building News for a Better Environment*, Sep/Oct 1995. Available at 1-800-653-3445.

❑ *"Air Distribution for the Exemplary Home"* (an excerpt from *The Exemplary Home Builders Field Guide*). Available at 919-857-9000, FAX orders to 919-832-2696.

❑ *"Energy Efficient Ducts: How and Why",* Electric Power Research Institute, Report TR-106443. Available in January 1997 from the EPRI Distribution Center, Oakland CA, (510) 934-4212.

❑ *A Builder's Guide to Residential HVAC Systems*. Available in January 1997 from the National Association of Home Builders (NAHB) Press, 1-800-223-2665.

❑ *Manual D: Residential Duct Systems,* 1995, 2nd printing, Air Conditioning Contractors of America. Available at 202-483-9370.

❑ *Airtight Ducts in New Construction* - a 3-day course on quality duct systems, offered by Alternative Energy Corporation (AEC), Raleigh NC. For information, call 919-857-9000.